QMF Data Service
13.1

Customization Guide

IBM

> **Note**
>
> Before using this information and the product it supports, be sure to read the general information under "Notices" at the end of this information.

Contents

Chapter 1. Customizing the Data Service server

After you install IBM® DB2 QMF® Data Service using SMP/E, customize the server for use.

Before you begin
You must install Data Service and apply all available maintenance before customizing the server. To apply server maintenance, you should acquire available PTFs and apply them to the server so you will have the most current available code for your installation.

Preparing to customize

Before you start to customize IBM® DB2 QMF® Data Service, familiarize yourself with the customization tasks.

The following table describes each significant customization task. Use this checklist to guide you through the customization process.

Table 1. Customization checklist

Step	Task description	For more information
1	Create the server data sets using the *hlq*.SCQDCNTL members CQDDFDIV, CQDGNMP1 and CQDEXSWI.	See "Creating server data sets" on page 2.
2	Set up the security application to use with the server using one of the following *hlq*.SCQDCNTL members: CQDRAVDB, CQDA2VDB, CQDTSVDB.	See "Defining security authorizations" on page 3.
3	Configure Workload Manager (WLM) for optimum performance of the server.	See "Configuring Workload Manager (WLM)" on page 3.
4	APF-authorize the product LOAD library data sets.	See "APF-authorizing LOAD library data sets" on page 4.
5	Create a copy of the product libraries (optional).	See "Copying target libraries" on page 4.
6	Configure the server to support DBCS (optional).	See "Configuring support for code pages and DBCS " on page 5.
78	Customize the server to access your data sources in *hlq*.SCQDEXEC(CQDSIN00).	See "Customizing the server initialization member" on page 4. Then, see Configuring access to data sources for the specific types of data sources the server should access.Then, see "Configuring access to data sources" in the *Solutions Guide* for the specific types of data sources the server should access.
89	Configure the started task JCL located in *hlq*.SCQDCNTL(CQD1PROC) before you can start the server.	See "Configuring the started task JCL" on page 6.
910	Configure the CLIST that invokes the ISPF panels by using *hlq*.SCQDEXEC(CQD).	See "Configuring the ISPF application" on page 7.

Table 1. Customization checklist (continued)		
Step	Task description	For more information
1011	Verify the installation by creating a virtual table and accessing its underlying VSAM file (optional).	See "Verifying the Data Service server installation" on page 10.

Required naming conventions

You must follow the Data Service server naming conventions when configuring the server subsystem ID and the server initialization member.

The server subsystem name must follow the pattern xQDy, where x is any alphabetic character A - Z and y is any alphanumeric character A-Z or 0-9.

Depending on what you name the server subsystem, the server initialization member must follow the same naming convention as the server subsystem name, for example, xQDyIN00.

Note: The default server naming conventions used throughout this guide are CQDS for the server subsystem name and CQDSIN00 for the server initialization member.

Creating server data sets

The CQDDFDIV and CQDGNMP1 members of hlq.SCQDCNTL create data sets for the Trace Browse, the global variable checkpoint, and the data-mapping facility (DMF) that are used by the Data Service server. The CQDGNMP1 member also copies distributed data sets into user-modifiable data sets. The CQDEXSWI member builds the Web interface objects.

Procedure

1. Customize the CQDDFDIV member in hlq.SCQDCNTL to meet your requirements. The CQDDFDIV member contains comments that describe how to customize the variables.
2. Submit the CQDDFDIV member.
3. Customize the CQDGNMP1 member in hlq.SCQDCNTL to meet your requirements. The CQDGNMP1 member contains comments that describe how to customize the variables.
4. Submit the CQDGNMP1 member.

   Note: The map data set created in this step should be the first concatenated data set in the DD statement CQDMAPP located in the server started task. See hlq.SCQDCNTL(CQD1PROC). The server should have read and write permissions to this data set. The system-provided data set (hlq.SCQDSMAP) should be the last data set in the CQDMAPP concatenation. The user and server should only have read access to the data set. The administrator will need read and write permissions.
5. Customize the CQDEXSWI member in hlq.SCQDCNTL to meet your requirements. The CQDEXSWI member contains comments that describe how to customize the variables.

   Note: The data set named on the RECEIVE command in the CQDEXSWI member is later used in the server initialization member CQDSIN00 for the **SWICNTLDSN** parameter definition, as follows:

   ```
   swiobj = SHLQ2||".SCQDOBJ"
   "MODIFY PARM NAME(SWICNTLDSN) VALUE("||swiobj||")"
   ```
6. Submit the CQDEXSWI member.

Defining security authorizations

To use an external security product, such as RACF, ACF2, or Top Secret, define the started task name to the security product and authorize the data set.

Procedure

To define the server and other required permissions for your security product, customize the appropriate security option located in the `hlq.SCQDCNTL` library, and submit the job:

- CQDRAVDB is for IBM Resource Access Control Facility (RACF) security.
- CQDA2VDB is for CA ACF2 (Access Control Facility) security.
- CQDTSVDB is for CA Top Secret Security (TSS).

Results

The following table summarizes the access requirements by data definition name:

Table 2. Access requirements by data definition name		
Data definition name	**Access**	**Data set name**
STEPLIB	READ, EXECUTE	*hlq*.SCQDLOAD
CQDRPCLB	READ, EXECUTE	*hlq*.SCQDRPC
SYSEXEC	READ	*hlq*.EXECFBSCQDEXEC
CQDTRACE	READ, WRITE	*hlq*.TRACE
CQDCHK1	READ, WRITE	*hlq*.SYSCK1
CQDMAPP	READ, WRITE	*hlq*.SCQDMAP

Make sure that your z/OS Security Administrator reviews the security definitions. You might need to change definitions to meet requirements at your site.

Configuring Workload Manager (WLM)

To get optimum performance from the server, define the server to WLM. The Data Service server should be prioritized slightly below the data provider in your WLM environment. It is not sufficient to simply add the STC to a WLM service class as the server will create independent enclaves for each connection.

About this task

The server should be configured to use a medium to high performing WLM velocity goal as its default service class.

Procedure

1. Create a WLM Classification rule.

    a) Go to the WLM ISPF application, and select option **6** (Classification Rules).

    b) Select option **1** to Create.

    c) Set the Subsystem Type to CQD, and provide an optional description.

    d) Under the Class/Service Column next to DEFAULTS, set the desired default service class name. If a desired service class does not exist, then create one using option 4 (Service Classes) under the **Primary WLM** menu. Press enter and PF3 to save.

2. Define the Data Service started task CQD1PROC to a WLM service class.

   a) Go to the WLM ISPF application, and select option 6 (Classification Rules).

   b) For the STC WLM-subsystem type, select **Modify**.

   c) Add an entry for CQD1PROC.

   d) Add an appropriate service class for the started task and define it relative to existing workload resource management objectives.

   e) Add a unique Report class for the started task.

3. Activate the new WLM policy definition.

APF-authorizing LOAD library data sets

You must authorize for APF (Authorized Program Facility) all LOAD library data sets allocated to the Data Service server.

About this task

All LOAD library data sets allocated to the Data Service server in the server started task JCL must be APF-authorized.

These LOAD library data sets are allocated to the following ddnames:

- STEPLIB

  You must authorize the LOAD library CQD.SCQDLOAD.

- CQDRPCLB

  You must authorize the LOAD library CQD.SCQDRPC.

If any data sets allocated to these ddnames are not APF-authorized, the Data Service server will issue the error message CQD0051S during startup identifying the ddname and data set name of each unauthorized library. Startup processing will discontinue and the server will shut down.

Procedure

The APF authorize should be done dynamically using the SETPROG APF command, and then made permanent for the next IPL (initial program load) by updating the appropriate system PARMLIB member.

Copying target libraries

It is recommended that copies be made of the target libraries to preserve any prior customization, as applying new maintenance often replaces existing PDS members.

Customizing the server initialization member

The server initialization member CQDSIN00 is a REXX program that you use to set product parameters and define links and databases. You must customize the server initialization member for your installation environment.

About this task

The server initialization member is shipped in data set member *hlq*.SCQDEXEC(CQDSIN00) and may have been copied to a new data set for customization in the step "Copying target libraries" on page 4.

As you go through the installation, you accept or set parameter values in the server initialization member.

If you are installing the server for the first time, it is recommended that all the default values be accepted. You can change the values as needed later.

If you are installing a new version of the server over a previous version, the previous server member might contain parameter values that you modified to meet specific requirements in your environment. In this case, you should review the initialization member for the previous version for any customizations that need to be made to the initialization member for the new version.

Procedure

1. Find the line that contains "SHLQ1" and provide your own high-level qualifier to define the ISPF data sets.

   For example: "SHLQ1=CQD"

2. If you created copies of your target libraries to preserve customizations, find the line that contains "SHLQ2" and provide your own high-level qualifier to define the Event Facility (SEF) data sets. Ensure that the HLQ results in proper data set references for these features.

   For example: "SHLQ2=CQD.CQDS". If you did not create copies of the target libraries, then "SHLQ2" should contain the same value as "SHLQ1".

3. Review the following default values for the TCP/IP parameters and change the values as necessary. The following example shows the section of the initialization member in which to make the changes:

```
"MODIFY PARM NAME(OEPORTNUMBER) VALUE(1200)"
"MODIFY PARM NAME(WSOEPORT) VALUE(1201)"

"MODIFY PARM NAME(TRACEOERW) VALUE(YES)"
"MODIFY PARM NAME(OEKEEPALIVETIME) VALUE(30)"
"MODIFY PARM NAME(PARALLELIO) VALUE(YES)"
"MODIFY PARM NAME(OEPIOPORTNUMBER) VALUE(1204)"
```

Configuring support for code pages and DBCS

You can configure the server to support Japanese code pages and double-byte character sets (DBCS).

About this task

To support different code pages and double-byte character sets, you must manually customize the server initialization member.

Procedure

1. Locate the server configuration member. The server initialization member is shipped in data set member *hlq*.SCQDEXEC(CQDSIN00) and may have been copied to a new data set for customization in the step "Copying target libraries" on page 4.
2. In the member, locate the DEFINE DATABASE statement for your subsystem, and verify that the CCSID value is set correctly for the subsystem.
3. Locate the comment Set CCSID for non-Db2 data, as shown in the following example:

```
/*----------------------------------*/
/* Set CCSID for non-DB2 data       */
/*----------------------------------*/

if DoThis then
  do
            "MODIFY PARM NAME(SQLENGDFLTCCSID)      VALUE(1047)"
            "MODIFY PARM NAME(SQLENGDBCSLTFMT)      VALUE(ASIS)"
```

4. Change DontDoThis to DoThis to enable the parameters.
5. Update the following parameters:

Parameter	Description	Valid values
SQLENGDFLTCCSID	Specifies the CCSID to use for SQL engine tables. All host tables except for Db2 are assumed to be stored in this CCSID. Where possible, this CCSID should match the client CCSID used when connecting.	CCSID value Sample values: • 1047 (LATIN OPEN SYS EB) • 931 (JAPAN MIX EBCDIC) • 1390 (JAPAN MIX EBCDIC)

SQLENGDBCSLTFMT	Specifies the format for DBCS Latin characters.	**ASIS**
		FULL
		    Fullwidth
		HALF
		    Halfwidth

Configuring the started task JCL

To configure the started task JCL, modify the CQD1PROC (subsystem default ID) member that is in the *hlq*.SCQDCNTL library.To configure the started task JCL, modify the CQD1PROC (subsystem default ID) member that is in the *hlq*.SCQDCNTL library.

About this task

The CQD1PROC member contains the JCL procedure that is required to run the main address space (started task).

Procedure

1. Add the HLQ name of the libraries to the *hlq* parameter.

   This parameter sets the server data set allocations to the correct data set names.

2. Confirm that the SYSEXEC DD statement allocates the correct data set name that contains the customized server initialization member CQDSIN00. This data set was created in job CQDGNMP1 previously in the step "Creating server data sets" on page 2. The default name is *hlq*.SCQDEXEC(CQDSIN00).

3. Ensure that the DD CQDMAPP concatenation points to the *hlq*.SCQDMAP data set created in the previous installation job CQDGNMP1. This data set should be first in the concatenation and is used for storing user-defined virtual table maps. The *hlq*.SCQDMAP data set, which contains the default virtual table maps that are part of the product distribution, should be placed last.

4. The server runs as a z/OS started task. Under normal circumstances, the server starts at system startup and stops before the system shuts down. To start the server on demand, use the following console command:

   ```
   S CQDS
   ```

   where *CQDS* is the subsystem name of the server instance you defined.

   Note: If you use a procedure name other than the SSID provided in the example, then you issue the start command using that procedure name.

5. If you use an automation package to start the system, associate the **START** command with the VTAM initialization complete message (IST020I), the TCP/IP initialization complete message (EZB6473I), or both messages.

6. To verify that the startup is successful, look for the following entries in the server Job Entry Subsystem (JES) log.

```
SD74391I OE stack binding port 1200 to IP address 0.0.0.0
SD74391I OE stack binding port 1201 to IP address 0.0.0.0
SD74391I OE stack binding port 1202 to IP address 0.0.0.0
```

What to do next

If you want to stop the server, issue the following console command:

P CQDS

If you issue a **CANCEL** command, all available connections terminate with an abend, and the server shuts down immediately.

Configuring the ISPF application

Configure and invoke the ISPF application.

Before you begin

The Data Service server must be started before you can invoke the ISPF application.

Procedure

1. Edit the *hlq*.SCQDEXEC(CQD) member, and replace the data set name in the following statement with the data set name that you chose for the *hlq*.SCQDLOAD library:

   ```
   llib='hlq.SCQDLOAD'
   ```

2. Copy the *hlq*.SCQDEXEC(CQD) member to a data set that is allocated to the SYSPROC allocation for all TSO users.

   Before starting the ISPF application, you must configure and start your server. See "Configuring the started task JCL" on page 6

   When the server starts, the ISPF data sets are dynamically allocated.

3. To invoke the ISPF application, go to the ISPF command shell and enter the following command:
   EX 'hlq.SCQDEXEC(CQD)' 'SUB(CQDS)'
   Where:

   - *hlq* is the high level qualifier.
   - *CQDS* is the subsystem name of the server instance you defined.

   All ISPF clients will communicate with the specified subsystem.

Configuring generation data set retrieval

You can configure the server to read only a subset of generation data sets (GDSs) by activating a VTB rule.

About this task

To read only a subset of generation data sets in a generation data group (GDG), you must enable virtual rule CQDGDGS1 and use the prefix GDG__ in your SQL statement.

A VTB rule is provided that allows a subset of the GDG to be read. VTB rule CQDGDGS1 is invoked by the SEF every time a table with the prefix GDG__ is found in the SQL statement.

The table name in the SQL statement must be of the form:

```
GDG__NumGens_RelGen_MapName
```

Where:

- GDG__ is a constant indicating a generation data set request.

- *NumGens* is a required number 0 through 999 indicating the number of generations to read.
- *RelGen* is an optional number 0 through 999 indicating the relative generation at which to start reading. A value of 0 is equivalent to a suffix of (0) in a JCL allocation; a value of 1 is equivalent to (-1), and so on.
- *MapName* is the table defined in the map data set.

For example, the following request will result in generations HLQ.GDG.STAFF(-3) through HLQ.GDG.STAFF(-6) being retrieved:

```
SELECT * FROM GDG__4_3_STAFF
```

Where the STAFF table specifies a base data set name of HLQ.GDG.STAFF. In other words, with this request, four generations will be read in descending generation order beginning with relative generation 3 (that is, generations 3, 4, 5, and 6).

Use the procedure in this task to enable sample rule CQDGDGS1.

Additional details:

When a request is made to allocate a data set, it will first be determined if the data set name represents a GDG base name. If so, a CSI lookup call will be made to return the associated GDS data set names. If a VTB rule does not specify the number of generations to read and MapReduce is disabled, or if there is a single generation, the GDG will be allocated using its base data set name, and normal system concatenation of generation data sets will occur. If MapReduce is enabled and there are multiple active generation data sets, a number of I/O processing tasks will be created. The number of I/O tasks is determined as follows:

1. If VPD is in use, the number of VPD I/O threads specified.
2. If MRC is in use, the number of active Client threads defined in the MRC request.
3. If neither VPD nor MRC is in use, the number of I/O threads will be equal to the lesser of the following:
   - The number of active generation data sets in the GDG
   - The number of generations requested by a VTB rule
   - The number of MapReduce tasks specified in the ACIMAPREDUCETASKS configuration

When the number of I/O tasks is equal to or less than the number of generation data sets, each task will read one or more complete data sets. When the number of I/O tasks exceeds the number of generation data sets, some tasks will be idle.

Procedure

1. Customize the server configuration member (CQDSIN00) to enable virtual table rule events by configuring the SEFVTBEVENTS parameter in the member, as follows
   :

   ```
   "MODIFY PARM NAME(SEFVTBEVENTS) VALUE(YES)"
   ```

2. Access the VTB rules, as follows:
   a) In the IBM DB2 QMF Data Service - Primary Option Menu, specify option E, **Rules Mgmt**.
   b) Specify option 2, **SEF Rule Management**.
   c) Enter VTB for **Display Only the Ruleset Named**.
3. Enable the rule by specifying E next to CQDGDGS1 and pressing Enter.
4. Set the rule to Auto-enable by specifying A next to CQDGDGS1 and pressing Enter.
   Setting a rule to Auto-enable activates the rule automatically when the server is re-started.

Configuring delimited data support

To be able to process delimited data using virtual tables, you must configure a virtual table rule to activate delimited data processing and optionally define delimiter values.

About this task

Data Service provides the ability to process delimited data from files, MQ data, and log streams using virtual tables mapped to MQ or z/OS files. The most common form of delimited data is comma separate value files (.csv).

When delimited data processing is activated, processing occurs in column order, so the delimited data must include a value for each column in the map in the correct order to prevent errors. Data conversion errors will occur if the delimited data is not compatible with the host types of the columns. If conversion fails, diagnostic information related to the error is automatically logged for troubleshooting problems.

Delimited processing is supported through virtual table rules only. Using virtual table rule options, you can enable delimited data processing, set column and string delimiter values, and control header record processing.

A sample rule, CQDMDDLM, is provided that documents these settings. Use the following procedure to configure the sample rule.

Procedure

1. Customize the server configuration member (CQDSIN00) to enable virtual table rule events by configuring the SEFVTBEVENTS parameter in the member, as follows

   :

   ```
   "MODIFY PARM NAME(SEFVTBEVENTS) VALUE(YES)"
   ```

2. Access the VTB rules, as follows:

   a) In the IBM DB2 QMF Data Service - Primary Option Menu, specify option E, **Rules Mgmt**.

   b) Specify option 2, **SEF Rule Management**.

   c) Enter VTB for **Display Only the Ruleset Named**.

3. Customize the CQDMDDLM rule, as follows:

   a) Specify S next to CQDMDDLM to edit the rule.

   b) Find the **vtb.optbdlcv** variable and set to 1 to activate delimited processing for a map.

   c) Update additional rule options as needed. The following table describes the VTB rule options that support delimited data processing.

VTB variable	Description
vtb.optbdlcv	Set to 1 to activate delimited processing for a map.
vtb.optbdlco	Set the column delimiter. The default value is the comma character (,). For example, if you use the colon character (:) as the column delimiter, specify **vtb.optbdlco = ':'**.
vtb.optbdlch	Set the character field or string delimiter. The default value is the quotation mark character ("). For example, if you use the hash character (#) as the string delimiter, specify **vtb.optbdlch = '#'**.
vtb.optbdlhr	Set to 1 to identify and remove the header record containing column names. If specified without a header prefix, the system compares the first token in each line to the first column name in the table to recognize and discard the header. The default is no header checking.

VTB variable	Description
`vtb.optbdlhp`	Define prefix data that identifies the beginning of a header line to be discarded. The specified value can contain a maximum of 32 bytes. This value is compared to the beginning of each delimited line of data before any tokenization is performed. For example, **`vtb.optbdlhp = '"NAME","ADDRESS"'`**. **Note:** If an **optbdlhp** value is defined, it supersedes any **optbdlhr** setting and the **optbdlhr** value is ignored.

    d) Save your changes and exit the editor.

4. Enable the rule by specifying E next to CQDMDDLM and pressing Enter.

5. Set the rule to Auto-enable by specifying A next to CQDMDDLM and pressing Enter.

    Setting a rule to Auto-enable activates the rule automatically when the server is re-started.

Verifying the Data Service server installation

To verify the server installation, create a sample VSAM file and a virtual table, and then run a query that accesses the VSAM data.

Procedure

1. Create the sample VSAM file on the mainframe that hosts the server. Run the CQDGNSTF member in the *hlq*.SCQDCNTL data set to allocate and load the sample VSAM file.
   The job should complete with a condition code of 0.

2. Create the `staffvs` virtual table. Run the CQDIVVS1 member in the *hlq*.SCQDCNTL data set to perform a batch extract of the sample VSAM file listing and create a virtual table that formats the result set that is returned from the VSAM file.
   This step runs a query against the sample VSAM file. The job should complete with a condition code of 0.

Notices

This information was developed for products and services offered in the US. This material may be available from IBM in other languages. However, you may be required to own a copy of the product or product version in that language in order to access it.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive, MD-NC119
Armonk, NY 10504-1785
US

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan, Ltd.
19-21, Nihonbashi-Hakozakicho, Chuo-ku
Tokyo 103-8510, Japan

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM websites are provided for convenience only and do not in any manner serve as an endorsement of those websites. The materials at those websites are not part of the materials for this IBM product and use of those websites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Director of Licensing
IBM Corporation
North Castle Drive, MD-NC119
Armonk, NY 10504-1785
US

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement, or any equivalent agreement between us.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Director of Licensing
IBM Corporation
North Castle Drive, MD-NC119
Armonk, NY 10504-1785
US

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement, or any equivalent agreement between us.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. The sample programs are provided "AS IS", without warranty of any kind. IBM shall not be liable for any damages arising out of your use of the sample programs.

Each copy or any portion of these sample programs or any derivative work must include a copyright notice as shown below.

© (*your company name*) (*year*).
Portions of this code are derived from IBM Corp. Sample Programs.
© Copyright IBM Corp. (*enter the year or years*).

Trademarks

IBM, the IBM logo, and ibm.com® are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web at http://www.ibm.com/legal/copytrade.shtml.

Linux® is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Java™ and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Other company, product, and service names may be trademarks or service marks of others.

Terms and conditions for product documentation

Permissions for the use of these publications are granted subject to the following terms and conditions:

Applicability: These terms and conditions are in addition to any terms of use for the IBM website.

Personal use: You may reproduce these publications for your personal, noncommercial use provided that all proprietary notices are preserved. You may not distribute, display or make derivative work of these publications, or any portion thereof, without the express consent of IBM®.

Commercial use: You may reproduce, distribute and display these publications solely within your enterprise provided that all proprietary notices are preserved. You may not make derivative works of these publications, or reproduce, distribute or display these publications or any portion thereof outside your enterprise, without the express consent of IBM.

Rights: Except as expressly granted in this permission, no other permissions, licenses or rights are granted, either express or implied, to the publications or any information, data, software or other intellectual property contained therein.

IBM reserves the right to withdraw the permissions granted herein whenever, in its discretion, the use of the publications is detrimental to its interest or, as determined by IBM, the above instructions are not being properly followed.

You may not download, export or re-export this information except in full compliance with all applicable laws and regulations, including all United States export laws and regulations.

IBM MAKES NO GUARANTEE ABOUT THE CONTENT OF THESE PUBLICATIONS. THE PUBLICATIONS ARE PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.

Privacy policy considerations

IBM Software products, including software as a service solutions, ("Software Offerings") may use cookies or other technologies to collect product usage information, to help improve the end user experience, to tailor interactions with the end user, or for other purposes. In many cases no personally identifiable information is collected by the Software Offerings. Some of our Software Offerings can help enable you to collect personally identifiable information. If this Software Offering uses cookies to collect personally identifiable information, specific information about this offering's use of cookies is set forth below.

This Software Offering does not use cookies or other technologies to collect personally identifiable information.

If the configurations deployed for this Software Offering provide you as customer the ability to collect personally identifiable information from end users via cookies and other technologies, you should seek your own legal advice about any laws applicable to such data collection, including any requirements for notice and consent.

For more information about the use of various technologies, including cookies, for these purposes, see IBM's Privacy Policy at http://www.ibm.com/privacy and IBM's Online Privacy Statement at http://www.ibm.com/privacy/details the section entitled "Cookies, Web Beacons and Other Technologies" and the "IBM Software Products and Software-as-a-Service Privacy Statement" at http://www.ibm.com/software/info/product-privacy.

Index

IBM.

Product Number: 5698-DB2
                   5698-DB2
                   5698-QMF